Thriving for Government Competitiveness Intelligence through Enterprise Architecture Establishment Process

Nur Azaliah A. Bakar¹, Harihodin S.² and Nazri Kama³

¹Advanced Informatics School (AIS), Universiti Teknologi Malaysia, nazaliah2@live.utm.my
²Advanced Informatics School (AIS), Universiti Teknologi Malaysia, harihodin@ic.utm.my
³Advanced Informatics School (AIS), Universiti Teknologi Malaysia, mdnazri@utm.my

ABSTRACT
Governments are continuously trying to improve the service delivery and efficacy in government functions. One of the methods to achieve this is by forming Competitive Intelligence (CI) strategies. CI strategy is developed by gathering the relevant data and transforming them into information for the use of strategic business decisions. Meanwhile, Enterprise Architecture (EA) initiative is introduced to realign the business and information in a structured manner. Yet there is lack of research explains on how EA can be utilised for CI purposes. This paper aims to investigate how EA can support the formation of CI, which will be used to make an intelligent decision making strategy for government organisation. A balanced scorecard approach is applied in this research. Preliminary study was conducted in Malaysian government and the results can be categorised into six themes, which are goal, authority support, financial, internal process, learning and growth, and technology.

Keywords: competitive intelligence, enterprise architecture, balanced scorecard.

1 INTRODUCTION
Governments are continuously trying to improve the service delivery and efficacy in government functions. This can be achieved by forming Competitive Intelligence (CI) strategies by capturing the data and transforming them into information for strategic business decisions. CI is a discipline that primarily concerns with the process and tools of gathering, analysing, and disseminating intelligence products that allow employees to make quality, effective decisions (Bernhardt, 1993; Gilad, 1989; Prescott & Miller, 2002). In government perspective, CI is beneficial in assisting the decisions making process for better organisational performance in the future, meanwhile for profit based organisation it is used to predict competitors’ upcoming action.

Meanwhile, Enterprise Architecture (EA) is a tool for strategic management used in unifying business process development and Information Technology (IT). EA is a hierarchical way that describes how the information systems, business processes and people in an organisation function as a whole (Fernández, 2013; Hjort-Madsen, 2009; Wan, Johansson, Luo, & Carlsson, 2013). Therefore in governmental context, EA is served as an umbrella for explaining the relationships among the government projects (Liimatainen, 2008).

Although, the concept and benefits of CI and EA are relatively related, yet there is lack of research explaining how EA and CI could complement each other. Studies also show there was a weak connection between CI and other the decision making process (Gaidelys, 2013; Salles, 2006; Tanev & Bailetti, 2008). In CI, most focus is on developing information gathering skills amongst CI professionals (Pellissier & Nenzhelele, 2013). Meanwhile in Malaysia, the CI research trends are more on the practice of CI in companies and profit organisations (Wahab & Othman, 2006; Yap & Rashid, 2011). Similarly with EA, most of the researches are focusing on EA adoption and implementation in organisations (Abd Razak, 2008; Abd Razak, Md Dahalin, Ibrahim, Yusop, & Kasiran, 2011; Md Dahalin, Abd Razak, Ibrahim, Yusop, & Hashim, 2011). Despite of increasing research interest in EA and CI, there is lack of effort to study the relationship between EA and CI in achieving the common goal which is better decision making to support organisation strategic management.

Therefore, this paper aims to investigate how the EA can support the formation of CI which will be used to make an intelligent decision making strategy for government organisation. The scope of this research is on the EA establishment process and it will explain how CI strategies can be derived from this process. Findings from preliminary study in Malaysian government context are used to describe the research in details.

The remaining five sections are as follows; Section II explains what are CI and EA and balanced scorecard (BSC) approach used in this research. Section III describes the methodology applied and Section IV explains the preliminary findings. In
Section V, EA-CI relationship model is proposed and finally, Section VI concludes the research.

II LITERATURE REVIEW

The next following section defined the competitive intelligence (CI), enterprise architecture (EA) and balanced scorecard (BSC) approach.

A. Competitive Intelligence (CI)

Competitive Intelligence (CI) is a process of producing and processing information about the environment of an organisation for strategic purposes (Kahaner, 1997; Vriens, 2004). Patterson (2000) defines CI as an actionable recommendations arising from systematic process, involving planning, gathering, analysing and disseminating information on the external environment, for opportunities or developments that have the potential to affect a company or a country’s competitive situation. The role of CI has always been to create knowledge. Employees monitor, examine and analyse data in order to make critical business decisions. In knowledge management terms, CI creates knowledge in terms of insights and understanding, known as ‘tacit knowledge’ in the users’ heads. The outcome of CI is decisions that improve and optimize business decisions (Du Toit, 2003).

B. Enterprise Architecture (EA)

Enterprise Architecture (EA) is comprehensive framework or taxonomy of systems analysis models for aligning organisational strategy with information technology. According to Rood (1994), EA consists of people, information, and technologies. EA can be viewed as a practice or an artefact. As a practice, it enables rigorous description, design and analysis of organisational structures that span the boundaries of different organisations (Lange & Mendling, 2011). As an artefact, it comprises principles, methods and models used to design and implement organisational structures, business processes, and information systems and infrastructure of an enterprise (Radeke, 2011; Winter & Fischer, 2006). Since Spevak (1993) introduced Enterprise Architecture Planning (EAP) in 1993, it is common practice to divide enterprise architecture into four architecture layers starts with business architecture on top followed by information architecture, applications architecture and technology architecture at the bottom.

C. Balanced Scorecard (BSC)

Balanced Scorecard (BSC) was developed by Kaplan and Norton in 1992 (Kaplan & Norton, 1992). According to Kaplan and Norton (1992), BSC is a framework to interpret strategic objectives into logical performance measurement components. BSC helps to make goals on the business level explicit, defines measures for controlling the goals, and sets target values. BSC is developed to cater for the different measurement perspectives and to provide a systematic process of implementing and obtaining feedback about strategy (De Vries & J van Rensburg, 2008). Kaplan and Norton (2001a) have introduced non-profit organisation measurement perspectives which are: cost, authority support, internal process, and learning and growth perspective, which will be used in this research.

In summary, every layer in EA and CI can be aligned. Technology/infrastructure and application layers in EA can be aligned accordingly with data layer in CI, followed by information layer in both EA and CI, and on topmost are business layer in EA and intelligence layer in CI. Both EA and CI support the same vision and mission of the organisation. Hence, BSC approach is used as a tool to design the decision making strategy that supports both EA and CI. The relationship between CI, EA and BSC is shown in in proposed research framework in Figure 1.

![Figure 1. The Relationship between CI, EA and BSC.](image-url)

III METHODOLOGY

The preliminary study involves set of interviews with respondents who are involved in EA establishment and government expert who has experienced in rolling out a nationwide ICT initiative. Total of five (5) respondents were interviewed; two (2) of them were Malaysian Public Sector EA project team, one (1) is Senior IT Consultant who has successfully roll out nationwide government IT initiative, one (1) IT officer from agency that has implemented EA and one (1) officer from business unit from agency that in process of implementing EA. These respondents were selected based on their experiences in EA establishment process, previous success in

Knowledge Management International Conference (KMICe) 2014, 12 – 15 August 2014, Malaysia
http://www.kmice.cms.net.my/
nationwide government IT project and their role in strategic decision making team. All five of them were able to contribute their view from both IT and business perspectives; from a specific agency scenarios to the whole governmental overview thus it shall provide the holistic view on how EA establishment process and CI are relatively connected.

The interview was conducted in one to one basis with time spent 30 minutes to two (2) hours for each interview. Data was interpreted based on respondent’s experience and examples of cases discussed during the interview sessions. The data also was supported by relevant documents such as documentation on EA establishment process and Malaysian Public Sector Strategic Plan both from IT and business perspective.

To analyse the preliminary data gathered, the researchers applied the data analysis process by Yin (2009) which consists of familiarisation, transcription, organisation of data, coding the data, building the description and themes, and finally writing the report. In this research, the data coding process is done by using Atlas.ti ™, the Computer Assisted/Aided Qualitative Data AnalysisS (CAQDAS) software and to build the themes and code, the researchers followed the Framework Analysis Guideline based on Ritchie and Lewis (2003). This framework will allow the categories and themes to be set accordingly from the beginning of the research. During the coding process, any new themes that emerged may be added in the hierarchical tree of themes. All derived themes will be used to construct the EA-CI relationship model based on BSC template by Kaplan and Norton (2001a). Next section will explain on the findings gathered from this preliminary study.

IV PRELIMINARY FINDINGS
This section will discuss on the findings of preliminary study. The findings can be classified into six themes, which are goal, authority support, financial, internal process, learning and growth, and technology.

A. Theme 1: Goal
All respondents agreed that goal is the important factor that influences the EA establishment process and CI. EA vision and mission must be clearly defined according to the organisation business and IT vision and mission, thus only that CI strategy can be formulated accordingly.

B. Theme 2: Authority Support
Respondents also agreed that continuous support from authority and stakeholder participation plays important roles in EA establishment process and CI formation. Authorisation is needed to ensure the all relevant information can be collected, sorted, captured and stored properly. In addition, respondents also emphasised on the importance of having a mandated EA rules and processes to ensure this EA-CI initiative can be implemented by all organisations.

C. Theme 3: Financial
Respondents reflected that, new EA establishment process shall focus on optimising the available resources instead of adding the whole new resources. Respondents also agreed it may be unnecessary to allocate new financial budget if EA and CI are able to assist organisation in strategic decision making.

D. Theme 4: Internal Process
Respondents agreed that EA and CI is a whole organisation initiative, therefore all action taken must be a business driven approach which involves both business and IT Team. Clear communication need to be provided by the EA-CI project team to ensure both business and IT team understand the whole EA initiative and how CI can be formulated. Respondents also agreed that all EA-CI need a proper planning so that it will assists top management and other related personnel to deliver their designated tasks accordingly.

E. Theme 5: Technology
Respondents agreed that good and easy to use EA tools will influence the EA establishment process. Therefore the selection of suitable tools, methodology, model and artefact must be made with a thorough deliberation involving all EA development team. The selected tools also should be able to support the CI strategy formation. EA programs are best to be incrementally implemented and the architecture frameworks need to be flexible enough for future expansion.

F. Theme 6: Learning and Support
All respondents agree that the aspect of learning and support must be given an important consideration to ensure the sustainability of EA-CI initiative. This includes the element of assessment and evaluation of the EA-CI, inculcating the EA-CI culture in the organisation and equipped the related personnel with relevant EA-CI skills. As a start an official repository can be set up in within organisation.

V PROPOSED EA-CI RELATIONSHIP MODEL
As mentioned earlier, the aim of this research is to investigate how the EA can support the formation of CI which will be used to make an intelligent decision making strategy for government
organisation. Therefore this research has aligned all layers in EA and CI as previously shown in Figure 1 and next step is to propose an EA-CI relationship model to support the organisation decision making process. To design the model, this research follows the BSC guideline by Kaplan and Norton (Kaplan & Norton, 1993, 2001a, 2001b). Firstly the goals in each perspective are defined according to four perspectives stated. Then the CI process cycle is mapped against the BSC process. Finally, the critical success factor (CSF) and key performance indicator metrics are created based on the findings from preliminary study.

A. Define Goals in Each Perspective
First step is to define the goal for each perspective. The strategic goal for financial perspective is “to establish EA in the most optimum financial resources”. The financial dimension explained that it is important to allocate and invest wisely in any EA solution. As a strategy to use organisation financial resources in the most optimum way, an in-house or joint-venture EA establishment can be considered as the best establishment solution for the organisation because the cost can be reduced and at the same time EA experts can be trained.

The strategic goal for customer or authority support perspective is “to obtain full support from the customer and authorised body in establishing the EA”. A customer in this research refers to the end users in the agency such as business domain team and data owners, whereas the authorised body is referring to corporate functions team such as group of CxOs, enterprise security team and also quality assurance/standards team. Among the corresponding measures for this perspective involves level of support, a clear Service Level Agreement (SLA) between GEA team and customer/authorised body and also the existence of responsibility assignment matrix (RAM), also known as RACI matrix. The strategy can be achieved by having a mutual agreement and expectation by GEA team and customer/authorised body during the GEA establishment process of that agency.

The strategic goal for internal process perspective is “to align the right business function with efficient IT support”. This perspective is concerned on the evaluation of internal business processes that is able to be created and delivered through EA. In this research, the internal process aims to increase productivity and efficiency of all e-government initiatives by improving the interoperability of the e-government applications.

The learning and growth perspective strategic goal is “to empower the people and organisation with EA through continuous learning and development of knowledge”. This perspective focuses on the future orientation in GEA that will benefit the personnel and the organisation itself. It also promotes a long term growth for the organisation by providing a continuous learning platform to ensure the achievement of the objectives of three other perspectives. This can be achieved by getting the best EA consultancy services and training; increasing the number of EA certified and trained personnel; providing a knowledge bank of EA strategic information and also encouraging the knowledge and technology transfer initiative. The relationship between each perspective’s goals is shown in Figure 2.

B. Mapping of BSC and CI Process
To form the CI strategy, it is important to understand the process in CI cycle. There are various CI cycles exist in the literature. In summary, the CI cycle can be generalised to five common processes; (1) planning and direction, (2) information collection, (3) information sorting, capturing and storing, (4) information analysis and (5) intelligence dissemination (Kahaner, 1997; McGonagle & Vella, 2012; Muller, 2002; Pellissier & Nenzhelele, 2013). Therefore this research has proposed a mapping of BSC and CI cycle process to depict how the establishment of EA able to contribute to the formation of CI strategy. To map the BSC and CI cycle process, the research follows the concept from Rummelr-Brache method. It is a method developed by Geary Rummelr and Alan Brache 1990 (Rummelr & Brache, 1990). This method of diagramming allows user to quickly and
easily plot the processes and, determine the interconnections between processes and process owner. The details steps are stated accordingly.

Step 1. Determine what to accomplish
Step 2. Clarify the processes that are focusing on
Step 3. Identify all participants (process owner) in
the processes analysed
Step 4. Create the diagram.
Step 5. List the step or activities required at each
stage of the process
Step 6. Analyses the diagram for potential areas of
improvement.

The final mapping result of BSC and CI process
during EA establishment is shown in Figure 3.

C. Construct the Metrics

After aligning the EA and CI process, identifying
the factors and forming the strategies final step is to
construct the metrics. Metrics is defined as a
system of standard of measurement (Merriam-
Webster, 2014; Oxford, 2014). At this stage of
research, a set of measurement metrics for EA
establishment process shall be proposed based on
preliminary study. This metrics and EA-CI
relationship model shall be revised accordingly
after conducting the exploratory study on the
selected case studies. Based on Kaplan and Norton
BSC template, all possible metrics is then mapped
accordingly as shown in Figure 4.

Figure 3. The mapping of the BSC and CI Process during EA
Establishment.

Figure 4. Metrics of EA Process Complied with CI Based on BSC
Template.

VI CONCLUSION

As a conclusion, CI and EA are both systematic
process. It is a process by which critical
information is available for anyone who needs it.
An EA-CI relationship model based on BSC
approach is able to outline the organisation CI in
holistic angles. The metrics of the model is
designed according to four perspectives; financial
(cost), customer (authority support), internal
process, and learning and growth. In future this
proposed model shall be tested in other government
organisation for it consistency and clarity.

ACKNOWLEDGMENT

The research is financially supported by Public
Service Department of Malaysia, Ministry of
Education Malaysia and Universiti Teknologi
Malaysia.

REFERENCES

practices in Malaysia. Communications of the IBIMA, 3, 133-137.
Abd Razak, R., Md Dahalim, Z., Ibrahim, H., Yusop, N. I., & Kasiran,
M. K. (2011). Investigation on the importance of enterprise
architecture in addressing business issues. Paper presented at the
International Conference on Research and Innovation in
Information Systems (ICRIS).
get it, use it and profit from it: Pitman Pub.